

CLAIMS:

1. A clutch mechanism comprising:

a first rotational member supported to be rotated by a driving force

5 from a driving power source;

a rotatably supported second rotational member coaxially positioned  
with respect to the first rotational member;

an operating spring extending along a peripheral surface of the first  
rotational member and a peripheral surface of the second rotational member,  
10 the operating spring having a first end and a second end, with the first end  
attached to the first rotational member so that the first end of the spring  
rotates with the first rotational member; and

means for restraining rotation of the second end of the operating  
spring during rotation of the first rotational member in one direction so that  
15 during rotation of the first rotational member in the first direction the  
diameter of the operating spring is reduced to cause the operating spring to  
engage the peripheral surface of the second rotational member so that the  
first and second rotational members rotate together.

2. A clutch mechanism according to Claim 1, wherein the means for restraining rotation of the second end of the operating spring during rotation of the first rotational member in the one direction comprises at least one braking member having an engaging portion engageable with the  
5 second end of the operating spring.

3. A clutch mechanism according to Claim 2, further comprising a collar member installed towards the second end of the operating spring, the at least one braking member being rotatably disposed at the collar member  
10 and generating a radially directed biasing force relative to a circumferential contact surface of the collar member.

4. A clutch mechanism according to Claim 3, wherein the contact surface of the collar member is an inner peripheral surface of the collar  
15 member, and the at least one braking member is disposed in the collar member in contact with the inner peripheral surface of the collar member and exerts the biasing force in a radially outward direction relative to the inner peripheral surface of the collar member.

5. A clutch mechanism according to claim 3, wherein the second end of the operating spring is provided with an approximately half-circle shaped engaged portion extending in a radially outward direction, and the engaging portion of the at least one braking member being formed as a bent end  
5 portion of the at least one braking member which is adapted to be received in the engaged portion of the operating spring.

6. A clutch mechanism according to claim 5, wherein upon rotation of the first rotational member in one direction, the engaged portion of the  
10 operating spring applies a force to the engaging portion of the at least one braking member which pulls the at least one braking member away from the contact surface of the collar member.

7. A clutch mechanism according to claim 6, wherein the at least one  
15 braking member comprises a C-shaped spring.

8. A clutch mechanism according to claim 1, wherein the means for restraining rotation of the second end of the operating spring during

rotation of the first rotational member in the one direction comprises at least one C-shaped spring.

9. A clutch mechanism according to claim 1, wherein the means for  
5 restraining rotation of the second end of the operating spring during rotation of the first rotational member in the one direction comprises first and second C-shaped springs.

10. A clutch mechanism according to claim 9, wherein the first and  
10 second C-shaped springs each have an engaging portion adapted to engage the second end of the operating spring, the engaging portion of the first C-shaped spring and the engaging portion of the second C-shaped spring being provided at the same side of the engaging portion of the second C-shaped spring in a circumferential direction of the spring.

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11. A clutch mechanism according to claim 9, further comprising:

linking means for linking the first and second C-shaped springs to restrain relative movement between the first and second C-shaped springs

in a circumferential direction.

12. A clutch mechanism according to claim 1, further comprising:

means for holding the operating spring to be coaxial with the first  
5 rotational member and the second rotational member prior to application of  
the driving force from the driving power source.

13. A clutch mechanism according to claim 1, further comprising:

a restraining member for restraining relative movement between the  
10 first end of the operating spring and the second end of the operating spring  
upon rotation of the first rotational member in a direction opposite the one  
direction.

14. A clutch mechanism according to claim 13, wherein the operating  
15 spring comprises a cylindrical main body and a radially outwardly  
extending engaged portion at the second end of the operating spring, the  
first rotational member comprising a guiding member housing the  
cylindrical main body of the operating spring, and wherein the restraining

member comes in contact with the engaged portion of the operating spring upon rotational movement of the first rotational member in a direction opposite the one direction.

5 15. A clutch mechanism according to claim 14, wherein the first rotational member further comprises an attaching portion for attaching the first end of the operating spring to the first rotational member, and wherein the guiding member comprises a guiding groove extending towards the attaching portion to permit the first end of the operating spring to be moved  
10 towards the attaching portion.

16. A clutch mechanism according to claim 15, wherein at least a portion of the guiding groove possesses a tapering shape narrowing towards the attaching portion.

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17. A clutch mechanism according to claim 16, wherein the guiding groove is a tapering slit which becomes more narrow towards the attaching portion, the guiding groove also possessing a bottleneck portion between an

end of the slit and the attaching portion, the bottleneck portion having a dimension smaller than an outer diameter of the first end of the operating spring.

5    18.    A clutch mechanism comprising:

          a rotatably supported first rotational member adapted to be rotated by a driving force from a driving power source;

          a rotatably supported second rotational member coaxially positioned with respect to the first rotational member;

10           an operating spring comprising a body portion extending around a peripheral portion of the first rotational member and a peripheral portion of the second rotational member, the main body of the operating spring possessing a diameter, the operating spring also possessing first and second ends located adjacent opposite axial ends of the body portion, the first end of

15    the operating spring engaging a portion of the first rotational member;

          at least one braking member having an engaged portion engageable with the second end of the operating spring to restrain movement of the second end of the operating spring when the first rotational member is

rotated in one direction so that rotation of the first rotational member is  
rotated in the one direction causes a reduction in the diameter of the main  
body of the operating spring so that a portion of the main body frictionally  
engages the peripheral portion of the second rotational member in a manner  
5 causing the first rotational member and the second rotational member to  
rotate together.

19. A clutch mechanism according to Claim 18, wherein the at least one  
braking member is installed in a collar member and generates radially  
10 directed biasing force against an inner peripheral surface of the collar  
member.

20. A clutch mechanism according to claim 18, wherein the at least one  
braking member is a C-shaped spring.

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21. A clutch mechanism according to claim 18, wherein the at least one  
braking member comprises first and second C-shaped springs.

22. A clutch mechanism comprising:

a rotatably supported first rotational member having a gear portion engageable with a worm gear of a driving power source to rotatably drive the first rotational member, the first rotational member having an outer  
5 periphery;

a rotatably supported second rotational member coaxially positioned with respect to the first rotational member, the second rotational member having an outer periphery;

an operating spring comprising a body portion coaxially arranged  
10 with the first and second rotational members and extending around a portion of the outer periphery of the first rotational member and a portion of the outer periphery of the second rotational member, the main body of the operating spring possessing a diameter, the operating spring also possessing first and second ends located adjacent opposite axial ends of the body  
15 portion;

at least one restraining spring engageable with a surface of a collar member and having an engaging portion engageable with the second end of the operating spring to restrain movement of the second end of the

operating spring when the first rotational member is rotated in one direction so that rotation of the first rotational member in the one direction causes a reduction in the diameter of the main body of the operating spring so that a portion of the main body frictionally engages a portion of the outer  
5 periphery of the second rotational member in a manner causing the first rotational member and the second rotational member to rotate together.

23. A clutch mechanism according to claim 22, wherein the at least one restraining spring is a C-shaped spring.

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24. A clutch mechanism according to claim 22, wherein the at least one restraining spring comprises first and second C-shaped springs.

25. A clutch mechanism according to claim 24, further comprising:

15 linking means for linking the first and second C-shaped springs to restrain relative movement between the first and second C-shaped springs in a circumferential direction.

26. A clutch mechanism according to claim 22, wherein the first rotational member is provided with an upstanding restraining wall portion which restrains movement of the second end of the operating spring upon rotation of the first rotational member in a direction opposite the one  
5 direction.

27. A clutch mechanism according to claim 22, wherein the first rotational member comprises a guiding member housing the body portion of the operating spring and an attaching portion at which the first end of the  
10 operating spring is attached to the first rotational member, the guiding member comprising a guiding groove extending towards the attaching portion to permit the first end of the operating spring to be moved towards the attaching portion.